

U.S. Application No.:
PRELIMINARY AMENDMENT

Attorney Docket: 3926.027

IN THE CLAIMS:

Page 9, line 1, please delete "PATENT CLAIMS" and insert therefore --What is Claimed is:--

Please cancel original Claims 1-23 and PCT Substitute Claims 1-23 and add the following new Claims 24-49 as follows:

--24. A process for improving performance of a system for recognizing traffic signs, said system including a camera and a therewith associated evaluation unit for image recognition or image display, said process comprising:

utilizing information originating from at least one of
(a) a map-based navigation system and
(b) a traffic information system

in the evaluation or display of contents of traffic signs.

25. A process according to Claim 24, wherein the system for recognition and/or display of traffic signs is in communication with the map-based navigation system or the traffic information system via an onboard data bus.

26. A process according to Claim 24, wherein the system for traffic sign recognition is capable of operating at a normal performance level and at least one enhanced performance level, and wherein said system is caused to operate at said enhanced performance level when it is determined on the basis of map-based information that the vehicle is passing through an area in which recognition of traffic signs may be problematic.

27. A process according to Claim 26, wherein within said problematic areas supplemental subdivided recognition processes are carried out, comprising:

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- a) when entering or leaving communities, carrying out a specific search for signs indicating entry of a community and leaving of a community,
 - b) when in the area of traffic influencing facilities, changing signs or traffic lights, searching for any change in the type and manner of the representation of the traffic signs,
 - c) when in an area in which poor visibility due to fog or rain may be present and a higher probability of contrast-poor images may be required, effecting an increase in the contrast enhancement of the image data.

28. A process according to Claim 24, wherein thereby characterized, that the type or the position or the condition or the visibility or the size of a recognized traffic sign is stored in a data storage unit associated with the map-based navigation system or the traffic information system.

29. A process according to Claim 28, further comprising emitting, by means of a signal producer contained in the display unit, an acoustic or optical signal when along an already traveled road segment a change with respect to the position or a change as to the presence or absence of a traffic sign occurs.

30. A process according to Claim 24, wherein the type and/or the position and/or the condition and/or the visibility and/or the size of a recognized traffic sign is stored in a data storage unit associated with the system for recognition of traffic signs.

31. A process according to Claim 30, further comprising emitting, by means of a signal producer contained in the display

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unit, an acoustic or optical signal when along an already traveled road segment a change with respect to the position or a change as to the presence or absence of a traffic sign occurs.

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32. A process according to Claim 24, wherein starting at the map-based navigation system or the traffic information system, a program for application of a decision logic is controlled in such a manner, that the image of the traffic sign is displayed for such a period, until a predetermined traveled path stored in the storage unit has been traveled.

33. A process according to claim 32, wherein said predetermined traveled path is dependent upon the class of traffic sign.

34. A process according to Claim 32, wherein said predetermined traveled paths are programmed into a data storage unit.

35. A process according to Claim 24, wherein the system for recognition of traffic signs, during the processing of image data provided by an image sensor,

examines these image data for the presence of traffic signs,
extracts data corresponding to traffic signs,
separates the extracted data into upper and lower classes
and in association therewith extracts class-specific
characterizing data, and
supplies these extracted class-specific characterizing data
to a separate classification.

36. A process according to Claim 35, wherein the classification occurs hierarchically, in multiple classification steps.

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37. A process according to Claim 35, wherein the classification steps are essentially set up follows:

a) first, only the characterizing data associated with the upper class of the object is supplied to a classifier,

aa) upon successful classification, wherein the class is recognized correctly with a high degree of confidence, the characterizing data are replaced by the appropriate symbolic representation of the upper class stored in the memory unit,

ab) upon unsuccessful classification, wherein the class could not be correctly recognized with a high degree of confidence, the characterizing data for the upper class and the charactering data for the lower class are replaced by the corresponding original image data originating from the image sensor,

b) if the classification of the upper class was successful, then subsequently the characterizing data associated with the lower class of the object are supplied to a classifier,

ba) upon successful classification, wherein the class is recognized with a high degree of confidence, the characterizing data are replaced by the appropriate symbolic representation of the lower class stored in the memory unit,

bb) upon unsuccessful classification, wherein the class could not be correctly recognized with a high degree of confidence) the characterizing data for the lower class are substituted by the original image data from the image sensor.

38. A vehicle-mounted device for enhancing the performance of a system for recognizing traffic signs, which system includes a camera and a therewith associated evaluation unit for image recognition or for image display,

wherein said system is associated with at least one of (a) a map-based navigation system and (b) a traffic information system so as to utilize information originating therefrom in the process of recognition or display of contents of traffic signs.

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39. A device according to Claim 38, wherein the system, the map-based navigation system, and/or the vehicle traffic information system are connected via an onboard data bus.

40. A device according to Claim 38, wherein the system for traffic sign recognition has the capacity to work at a base level of performance and an enhanced level of performance, and wherein said enhanced level of performance is engaged when, on the basis of map-based information, it is determined that the vehicle is passing through an area in which the recognition of traffic signs may be problematic.

41. A device according to Claim 38, wherein one of (a) the map-based navigation system and (b) the traffic information system is provided with a data storage unit, in which at least one of the type, the position, the condition, the visibility and the size of the recognized traffic sign is stored.

42. A device according to Claim 38, wherein the system for recognizing traffic signs is provided with a data storage unit, in which at least one of the type, the position, the condition,

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the visibility and the size of the recognized traffic sign is stored.

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43. A device according to Claim 38, wherein the display unit includes a signal emitter which emits an acoustic or optical signal when said vehicle travels along a previously traveled road segment and said system for recognizing traffic signs detects a change with respect to the position or the presence or absence of a traffic sign.

44. A device according to Claim 38, wherein a program for utilization of a decision logic is provided in the system, which program displays the image of a traffic sign until a predetermined path length, as determined by at least one of (a) the map-based navigation system and (b) the traffic information system, has been traveled.

45. A device as in Claim 44, wherein said predetermined path length is specific to the class of traffic sign.

46. A device according to Claim 44, wherein a memory unit is provided in the system, in which the predetermined path lengths are stored and via which they are made available for processing.

47. A device according to Claim 38, wherein a processing unit is provided in the system for recognition of traffic signs, which processing unit includes a program according to which it examines image data supplied by an image sensor for the presence of traffic signs, then extracts these data, separates these into upper and lower classes and in this context extracts class

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specific characterizing data and separately supplies these to a classifier.

48. A device according to Claim 47, wherein this classifier is constructed hierarchically, in multiple classification steps.

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- a) first, only the characterizing data associated with the upper class of the object is supplied to a classifier,
 - aa) upon successful classification, wherein the class is recognized correctly with a high degree of confidence, the characterizing data are replaced by the appropriate symbolic representation of the upper class stored in the memory unit,
 - ab) upon unsuccessful classification, wherein the class could not be correctly recognized with a high degree of confidence, the characterizing data for the upper class and the charactering data for the lower class are replaced by the corresponding original image data originating from the image sensor,
- b) if the classification of the upper class was successful, then subsequently the characterizing data associated with the lower class of the object are supplied to a classifier,
 - ba) upon successful classification, wherein the class is recognized with a high degree of confidence, the characterizing data are replaced by the appropriate